# LNP Framework

| | Attribute | Description | Weight |
|---|---|---|---|
| | **6. Service Interactions (cont'd)** | | |
| | I. AC/AR | Automatic Callback Calling and Automatic Recall shall function properly, including:<br>1. AC/AR to an on hook subscriber<br>2. AC/AR to an off hook subscriber | |
| | J. Screening List Editing | 1. Incoming call screening tables shall function properly on calls from ported numbers<br>2. TCAP messages for establishing Screen List Entries shall function properly on ported number entries | |
| | K. Caller ID and Privacy | The caller ID shall function normally. This shall include passing the proper calling number info and privacy indicators. Caller ID will display the public number, and block display when the privacy indicator is set | |
| | L. Caller ID w/Name | 1. The proper calling name shall be displayed<br>2. The correct name database shall be accessed<br>3. The service shall interwork with both TR-1188 and AIN CNAM databases | |
| | M. Call Forwarding | 1. The proper calling number fields shall be passed under a call forwarding condition<br>2. Call forwarding shall be allowed to intraoffice DN's which are ported in or out of the office | |
| • | N. Calls to Ported Service Access Codes Numbers (500, 800, 900 etc.) | 1. This solution shall accommodate calls to ported SAC numbers<br>2. Mandated call set-up times shall not be compromised | |
| | O. ISDN Circuit Switched Voice | 1. The proper public calling number shall be presented to an ISDN set in the display text information element<br>2. The proper public calling or billing number shall be presented to an ISDN BRI/PRI in the calling party number/billing number information element<br>3. The proper redirecting number shall be presented to an ISDN set in the redirecting number information element | |
| • | P. ISDN Circuit-Switched Data | Calls to and from ported ISDN data lines using NANP addresses shall be routed and billed properly | |
| • | Q. ISDN Packet Data | Calls to and from ported packet data lines using NANP E.164 addresses shall be routed and billed properly | |
| | R. Network Voice Messaging | 1. Calls to ported network mailboxes shall be forwarded properly for mail systems using the Redirecting Number<br>2. Calls to ported network mailboxes shall be forwarded properly for mail systems using the Original Called Number<br>3. The message waiting indication shall be properly provided for ported number when using network voice messaging | |

# LNP Framework

| | Attribute | Description | Weight |
|---|---|---|---|
| | **6. Service Interactions (cont'd)** | | |
| | | 4. Calls to network mailboxes must interact properly with Simplified Message Desk Interface | |
| A | S. Customer Originated Trace | Implementation of number portability shall not affect customers' use of this feature | |
| A | T. Selective Call Acceptance | Implementation of number portability shall not affect customers' use of this feature | |
| A | U. Selective Call Rejection | Implementation of number portability shall not affect customers' use of this feature | |
| A | V. Customer Originated Service Order Activation/Deactivation | Implementation of number portability shall not affect customers' use of this feature | |
| A | W. "RingMaster" | Implementation of number portability shall not affect customers' use of this feature | |
| | **7. Operator Svcs** | | |
| | A Busy Line Verification | An operator must be capable of accessing a busy ported number line | |
| | B 3rd Party Billing | Ported numbers must be validated using other LIDBs, describe how LIDB functions are performed | |
| | C Calling Card | Ported calling card numbers must be validated using other LIDBs, describe how LIDB functions are performed | |
| | D Collect Calls | | |
| | E Call Trace | 1. The operator must be able to identify the originating entity and telephone number for emergency call traces<br>2. The operator must be able to activate the trace key to generate an OSPS/TOPS office printout indicating, at minimum, defective originating office, trunk group, and originating telephone number | |
| | F Coin - Local & Toll (including Hotel/Motel - T&C) | Proper coin routing and control shall be provided when the terminating number has been ported | |
| | G Coin Sent Paid | How are coin sent paid calls handled? | |
| * | **8. 911/E911 Impact** | Calls to 911 shall be routed to the proper PSAP. The proper number/address shall be displayed on 911 systems that utilize the billing number and on systems that utilize the calling number. Call control must be retained by PSAP<br>Must adhere to ILL Adm. Code 725<br>State the impact on call set-up time and post dial delay for calls from ported and non-ported numbers to 911.<br>Describe the impact upon call completion rate from ported and non-ported numbers to 911. | |
| * | **9. DA Features Supported** | | |
| | A. Branded DA Capability | Provide capability to uniquely identify service provider - branding | |

# LNP Framework

| | Attribute | Description | Weight |
|---|---|---|---|
| | **10. Rating and Billing** | | |
| | A. Transparency | Customers shall perceive no difference when a number is ported | |
| | B. AMA Recording | Provides capability of recording AMA at the appropriate switching points. Comply w/Bellcore specs. GR-1100-CORE - Billing Format Requirements and Section 8.1 of the LSSGR (TR-NWT-000508) | |
| | C. LERG Impact | The LERG can continue to be used for rating purposes without change | |
| | D. Sent Collect | Messages billed out-of-state can be forwarded to the proper billing center | |
| | E. 800 Calls from Ported Numbers | 1. 800 calls from ported numbers shall be routed based on the resident switch NPA/NXX<br>2. 800 calls from ported numbers shall be rated based on the originating switch NPA/NXX | |
| | F. Directory Assistance Call Completion | 1. DA Call Completion Systems shall properly rate and bill calls to ported numbers<br>2. The DA system shall be able to determine, rate, and bill calls from ported numbers | |
| • | G. Access Records | Provides the ability to generate accurate access recordings | |
| | H. Call Rating | Solution should support proper call rating - POLICY ISSUE | |
| | I. 10 Digit Number Recording | Describe capability to record a 10-digit number with its appropriate NPA. Requires that two NPAs with the same NXX be supported in one switch | |
| | | Rating and billing to the user must be transparent | |
| A | J. Carrier Identification | Number portability should not inhibit ability to identify carrier(s) on customer bill | |
| | **11. Operations Support Systems Impact** | | |
| | A. Ordering | Minimizes the impact on current service ordering support systems | |
| • | B. Provisioning (e.g. COSMOS) | Minimizes the impact on current service provisioning support systems | |
| | | POLICY ISSUE - What is the policy/requirement for service provider number porting provisioning interval | |
| | C. Maintenance (e.g. Repair Bureau) | Minimizes the impact on current service maintenance support systems | |
| | D. Service Testing (e.g. MLT) | Minimizes the impact on current service testing support systems | |
| | E. Service Billing (e.g. CRIS) | Minimizes the impact on current service billing support systems | |
| | F. Network Management | Minimizes the impact on current network management support systems | |
| | **12. Switch Impact** | | |
| • | A. DMS 10<br>DMS 100 | Describe impact on switch software and hardware | |

# LNP Framework

| | Attribute | Description | Weight |
|---|---|---|---|
| | **12. Switch Impact (cont'd)** | | |
| | DMS 250<br>DMS 500<br>B. GTD5<br>C. Siemens<br>D. 5ESS<br>4ESS<br>1AESS<br>E. Ericsson<br>F. Non-Conforming Switches<br>G. TOPS/OSPS Enhancements | Requires minimal impact on TOPS/OSPS system | |
| * | **13. AIN/IN Impact**<br>A. Performance Impact<br>B AIN Services Impact | Describe impact on performance of AIN system<br>Describe impact on AIN services | |
| A | **14. Application/Extendability**<br>A. Service Provider<br>B. Geographic (Wirectr, NPA, LATA, State, etc )<br>C. Service<br>D. Wireless | Is solution capable of providing service provider portability?<br>Is solution capable of providing geographic portability? If so, describe how and scope<br>Is solution capable of providing service portability?<br>Can wireless networks utilize this solution? Describe | |
| | **15. Impact on N.A. Numbering Plan**<br>A. Number Conservation/Utilization/Efficiency<br>B. Administration<br>C. Ease of NPA Split/Mass Changes | What number resources are used?<br>How are number resources conserved?<br>Describe impact on numbering plan administration<br>Describe impact on NPA splits and other mass number changes | |
| * | **16. Administration**<br>A. User Friendly<br>B. Security<br>C. Graceful Software Updating | Describe human interfaces. How are they user friendly?<br>Describe security capabilities of system<br>Describe how software is updated:<br>New Release<br>Minor Changes<br>Bug Fixes | |



* Change
A Addition

# LNP Framework

| | Attribute | Description | Weight |
|---|---|---|---|
| | **16. Administration (cont'd)** | | |
| | D. Switch Translations | POLICY ISSUE - What is policy/requirement for service continuity when LNP system is being updated? | |
| | 1 Impact | Describe impact on switch translations for ported to, ported from and non-participating switches | |
| | 2. Recent Change Impact | Describe impact on switch recent changes | |
| * | **17. Patents/Licensing/Copyrights Impact** | Describe any patents, patents pending, anticipated licensing copyrights, fees, etc. which may be associated with this solution | |
| | **18. Impact on NA Numbering Plan - Cellular** | Specific Service Providers Numbers cannot be placed within a number portability pool due to their impacts on current Cellular Operations | |
| | A Internal Routing Numbers | Numbers utilized strictly for internal call routing within cellular environments | |
| | 1. Dynamic Allocation for Call Setup | Dedicated pool of numbers referred to as TLDN's commonly used for call delivery while autoroaming. | |
| | 2. Test Numbers | Specific test number ranges have been set aside to be only used for testing both internally or externally. Example: Nationwide Autoroaming tests | |
| | B Special Corporate Account Numbers | Many Corporations require complete ranges from specific NXX's for their internal accounts with Cellular providers. | |
| | 1 Special services for 100s groups | Some services are uniquely defined within a specific quantity of numbers | |
| | 2. Consecutive Numbers | Some services are uniquely defined within a consecutive range of numbers | |
| | **19. HLR/SCP/MSC** | Switch type currently used in the Cellular Environment. | |
| | A. Single number subscription | Single number subscriptions can be established within a HLR, creating limitations to the functionality of the HLR. | |
| | 1. Capacity | With single subscriptions versus multiple subscriptions what are the capacity issues? | |
| | 2. Processor load | With single subscriptions what will be the percentage increase in processor loads | |
| | 3. Transactions per second | With single subscriptions what will be the decrease in number of transactions per second vs. the number of transactions per second currently available? | |
| | B. Signaling requirements | Modifications to current signaling requirements, such as additional parameters in AIN 0.1, IS-41, and ISUP protocols, will require major software changes in all switch types. These changes will require full testing of all autoroaming functionality in all cellular networks and with all switch variations (All Vendors). | |

# LNP Framework

| | Attribute | Description | Weight |
|---|---|---|---|
| | **19. HLR/SCP/MSC (cont'd)** | | |
| | 1. **Method of Limiting Queries** | | |
| | a. Prevents "Looping" | Prevents the possibility of multiple trunk seizures due to a looping condition | |
| | b. Limits Queries on Intraoffice Calls | Offers a method to avoid queries on every intraoffice call | |
| | c. Limits Queries on Interoffice Calls | Offers a method to avoid queries on every interoffice call (originating, intermediate, or terminating) | |
| | d Avoids Redundant Queries | Offers a method to avoid multiple database queries on the same call. For instance, querying multiple times in the network to reach the appropriate terminating subscriber. | |
| | 2. Triggering | | |
| | a. Originating | Is an AIN/IN solution capable of performing DB Dip from N-1 office? Are new AIN/IN triggers required? If so, describe | |
| | b N-1 | Is an AIN/IN solution capable of performing DB Dip from originating office? Are new AIN/IN triggers required? If so, describe | |
| | c Terminating | Is an AIN/IN solution capable of performing DB Dip from terminating office? Are new AIN/IN triggers required? If so, describe | |
| | d AIN | How will triggers function with Advanced Inteligent Network software? (Release 0.0, Release 0.1, Release 0.2) | |
| | e. Multiple Triggers | Are modifications in place to support multiple triggers? (Triggers to HLR and Triggers to LNP) | |
| | 3. **ISUP modifications** | | |
| | a. Notification of DIP | Are modifications in place to notify when DIPs have or have not been completed? | |
| | b. Release Message | Are modifications in place to support new release values? | |
| | 4. HLR Subscriber Connection Status | A method of status for differentiating between "Not Connected" and "Not in Service" subscribers must be established? | |
| | 5. Call setup/ost dial delay | State impact on call setup time and post dial delay for calls to ported and non ported numbers. | |
| | 6. Capacity of SS7 network | Current SS7 intrastructures are designed never to exceed their capacity, should increased load occur with the addition of NP then current SS7 infrastructures will need expanded.<br>State the impact of your architecture on the signaling network in a typical area containing 12 MSCs and 6 HLRs, assuming 20,000 ported numbers out of 1,500,000<br>Assume an average of 1.65 Busy Hour Originating Calls per station, 1.40 Busy Hour Terminating Calls per station, and .4 Busy Hour Intraoffice calls per station | |

# LNP Framework

| | Attribute | Description | |
|---|---|---|---|
| | **19. HLR/SCP/MSC (cont'd)** | | |
| A | 7. Compatibility/standards | Modifications to existing standards such as IS-41, AIN 0.1, and ISUP will be required to make NP compatible with Cellular autoroaming.<br>Describe the impact that these modifications will have on Cellular networks | |
| | C. MSC mobile station analysis table | Existing methods for updating the mobile station analysis tables will need to be enhanced with NP.<br>Please explain the impact on the mobile station analysis table with single subscriptions (Refer to the following: Impacts, Size, Addressing, Limitations, Functionality, and etc.) | |
| | D. Call routing and Translations (also, routing ambiguities) for ported to, ported from and non-porting switches. | Changes to existing call routing and translations functions will be required for supporting cellular registration, validation, and call delivery<br>Please explain the impact on existing routing and translation functions | |
| | E. Impact on CRMS (Communications Radio Mobil Service) switches<br>1. Motorola<br>2. AT&T<br>3. Ericsson<br>4<br>5. | Describe impact on switch hardware & software | |
| | **20. Cellular Nationwide Roaming/Technical considerations** | Cellular Nationwide Roaming allows subscribers to autoroaming across the nation, while utilizating most of the same services available in their home market. | |
| | A. Protocols/Network Topology | Changes to the existing cellular autoroaming protocol IS-41 will be required to support Registration/Validation within the nationwide cellular networks.<br>Functionality of nodes may change, and this change must have limited impacts on current market functionality. | |
| | B. Network address | Nationwide cellular networks will need to be updated with all number portability network addresses. | |
| | C. Interconnection points | Interconnection points for nationwide roaming utilize quad "B" links to redundant STP mated pairs, there should be no impact with number portability on these interconnections. | |
| | D. Redundancy/backup systems | Complete redundant and backup systems are required for NP to create stability for all carriers. | |
| | E. Development of test procedures | New test procedures will need to be developed for NP, because existing autoroaming functionality will require modifications. | |

# LNP Framework

| | Attribute | Description | Weight |
|---|---|---|---|
| | **20. Cellular Nationwide Roaming/Technical considerations (cont'd)** | | |
| | F. Troubleshooting | Quick and efficient troubleshooting is a key to providing quality service for customers, which must be maintained with the addition of number portability. | |
| | G. Impact on Dip Incapable systems | Some systems may not be capable of Dip queries, which could hinder cellular autoroaming functions in those markets. | |
| | H. Cellular End User Impacts | Concerns on the ability to autoroam. | |
| | **21. Fraud Impacts** | Fraudulent Activity must not be added or encouraged in any way with the addition of NP. | |
| | A. Administration | The administration of ownership for ported numbers must not encourage fraud | |
| | 1. Home Fraud | Number Portability must not encourage local area fraud. | |
| | 2 Autoroaming Fraud | Number Portability must not encourage nationwide fraud | |
| | 3 Manual Roaming Fraud | Number Portability must not encourage local area or nationwide fraud through the use of PRV.(Positive Roamer Validation) | |
| | B. Responsibility | Responsibility for fraudulent activity should be established prior to the implementation of NP. | |
| | 1 Actions to be taken | All actions to prevent fraudulent activity should be established prior to the implementation on NP. | |
| | C. Cost/Revenue Loss | Cost/Revenue Loss due to fraudulent activity should not be aided by the impacts of NP | |
| | **22. Rating and Billing** | Rating and billing will be impacted by number portability. | |
| | A. Market Impact | Rating and billing modifications may have great impacts on all markets current post processing methods. | |
| | 1. Transparency | Customers shall perceive no difference when a number is ported | |
| | 2. AMA Recording | Provides capability of recording AMA at the appropriate switching points. Comply w/Bellcore specs. GR-1100-CORE-Billing Format Requirements and Section 8.1 of the LSSGR (TR-NWT-000508) | |
| | 3. Lerg Impact | The LERG can continue to be used for rating purposes without change. | |
| | 4. Settlement Process | If NP traffic for cellular carriers in it's initial stages does not warrant the economics of purchasing their own LNP, then a settlement process needs to be considered between the wireline and cellular carriers for queries to the wireline LNP's. | |
| | | A method must be defined to collect the number of query records for LNP DIPs | |

# ICCF

## Access Arrangements for New - Non-Geographic Services Workshop
## Lansdowne, VA - August 24, 1995

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|---|---|
| ISSUE: | Access Arrangements for New Non-Geographic Services Workshop |
| TITLE: | PCS 500 Access Arrangement |
| SOURCE: | **Cellular Telecommunication Industry Association (CTIA)**<br>Numbering Advisory Group: |


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ABSTRACT: This contribution summarizes CTIA's recommendation for the provision of the PCS 500 Service Access Code (SAC). This service will provide subscribers of the 500 SAC the ability to efficiently process calls from any terminal that is either fixed or wireless, regardless of the service provider selected.

# 1.0 Introduction

The following contribution is made on behalf of the Cellular Telephone Industry Association (CTIA) member carriers for inclusion in the Industry Carriers Compatibility Forum (ICCF) report, "Access Arrangements for New Non-Geographic Services."

## 1.1 Purpose

This contribution offers a general architecture that supports the efficient routing of Non-Geographic Numbers, such as the 500 Service Access Code.

The functional architecture described in this document specifies the various functional elements and interfaces which potentially may be needed to provide non-geographic services access. Not all elements of the architecture may be needed in every case and the physical implementations may appear substantially different. Some elements may require business and/or industry agreements. It is not the intent of CTIA to propose any specific network configuration or imply any legal or regulatory statements.

## 1.2 Overview

Subscribers of Personal Communications Services (PCS) will ultimately have the ability to place and receive calls from any terminal that is either fixed or wireless. A PCS service provider will assign their subscribers 500-NXX-XXXX numbers upon subscription. This personal number is used to identify the PCS subscriber. The PCS 500 networking infrastructure must then be able to associate the subscriber's personal number with a specific terminal identification, which is a geographic number (GN), so that incoming calls can be routed to that terminal location whether or not the subscriber and/or terminal is in the home territory or is roaming.

The terminal address of the subscriber must be registered to be used with the network so that the network can deliver all subscriber services and support call origination and delivery. Subscribers maintain a service profile allowing them to register their own or shared terminals in advance. The PCS network uses the subscriber's service profile to locate the PCS 500 subscriber at all times. Following user registration at a terminal, subsequent calls associated with that user permit the PCS network infrastructure to determine the subscriber's service provider (SP), identify the subscriber's profile, provide all subscriber services and perform the normal functions of call setup, call routing, billing, etc.

# 2.0 Functional Architecture Description

The functional architecture of the PCS 500 access arrangement is illustrated in figure 1. Descriptions of the network elements in the architecture are discussed in section 2.1. Section 2.2 describes the interfaces in the PCS access arrangement.

## 2.1 Descriptions of the Functional Elements

### 2.1.1 Global PCS 500 Subscribers Database

PCS 500 number to service provider identification (SPID) mappings are information needed by the network for call routing. This information will be available to PCS 500 service providers. The SPID can be

- an address (e.g., SS7 point code and subsystem number for the service provider's database or an address of the service provider's switch)
- a carrier identification code (CIC)
- a trunk group ID

Mappings of PCS 500 numbers to SPIDs will be contained in the Global PCS 500 subscribers database. The PCS 500 number to service provider mapping capability of the Global PCS 500 subscribers database may be provided in the form of industry literature (LERG) or a mechanized SMS-like database.

This database is shown in figure 1.

### 2.1.2 Local SCP with PCS 500 Service Provider Database

The PCS 500 service provider (SP) database will contain the service profile of subscribers served by the local Service Control Point (SCP). The service profile can be maintained by the PCS 500 subscriber using registration procedures. It reflects the subscriber's instruction to the network as to where his/her calls should be delivered to at a given time. For example, the subscriber may be at work from 8AM to 5PM, in the car from 5PM to 6PM, at home from 6PM to 8AM, on business travel during specific days (Wednesday from 7AM to 10AM at 617-466-1234 (car phone) and 10AM to 5PM at 212-280-3456 (wireline terminal at the airport conference room), etc. The service profile might also contain the subscriber's billing preference. For example, the subscriber might wish to pay for his/her incoming calls. The subscriber can register[1] from any terminal, fixed or wireless, and have calls delivered to the registered terminal as long as the terminal for call receipt grants permission for use.

The PCS 500 service provider database may also perform the 500 number to SPID mappings function[2].

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[1] Terminal registration means that the subscriber is providing the GN of the terminal that he/she intends to use at a specified time interval.

[2] Some PCS 500 service providers may choose to maintain the 500 number to SPID mapping internally in the switch allowing internal 500 number to SPID translations.

When a PCS 500 call is initiated, the originating switch may query the local SCP PCS 500 service provider database to obtain routing and other information[4]. The PCS 500 SP database may

- map the dialed 500-NXX-XXXX number to an SPID from the Global PCS 500 Subscribers Database content that is resident in the local SCP. If the SPID is an address of a remote SCP PCS 500 SP database then the local SCP PCS 500 SP database may launch a query to the remote SCP to obtain additional routing information.

or

- locate the service profile of the dialed 500 number in the local SCP PCS 500 SP database. Based on service profile information, a GN is selected from the service profile to be used for call delivery to the PCS subscriber. The service profile may contain billing preference information.

The local SCP PCS 500 service provider database returns a response with call handling information. Routing information returned may be either a GN or an SPID (e.g., trunk group ID, CIC or address of the service provider's switch).

### 2.1.3 Remote SCP with PCS 500 Service Provider Database

The PCS 500 service provider (SP) database of the remote SCP will contain the service profile of the subscribers served by the remote SCP. Otherwise, it provides the same functions as the PCS 500 SP database of the local SCP described above.

### 2.1.4 Originating AIN SSP or WIN MSC

The originating Service Switching Point (SSP) or Mobile Switching Center (MSC) supports Advance Intelligent Network (AIN)/Wireless Intelligent Network[5] (WIN) functionality. This switch communicates with the local SCP for query and response interactions[3/2]. In an IN infrastructure, the local SCP provides the SSP with instruction on how to proceed with call processing.

### 2.1.5 Originating Switch/MSC, with TCAP or SPID Capability

In this scenario, the originating switch or MSC has TCAP capability but does not support AIN/WIN functionality. This switch has the ability to launch a query message to the local SCP for calls initiated to PCS 500 numbers[3/2]. When this switch receives a response message from the local SCP with routing information, it will proceed with normal call delivery procedures using the received routing information.

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[3] If the originating switch does not have the capability to determine PCS 500 number SPID mapping, it routes the call to a switch that has mapping/query capability.

[4] There may be local SCPs with database content that does not maintain the downloaded PCS 500 numbers to SPID mappings. If that is the case, the originating switch may query the Global PCS 500 subscriber database for SPID information.

[5] TIA is developing standards for the WIN architecture and call models

### 2.1.6 Originating Switch/MSC, no TCAP or SPID Capability

For this case, the originating switch or MSC has no TCAP capability or internal SPID mapping capability. When this switch receives a call initiation for PCS 500 calls, it routes the call to a subsequent switch for further call processing. The subsequent switch will perform the number translation process before proceeding with call delivery.

### 2.1.7 Serving SSP/Switch

Both the serving SSP and the serving switch are the entities that provide call processing in the call path. The difference between the serving SSP and the serving switch is that the serving SSP operates in an IN based environment and the serving switch in a non-IN.

### 2.1.8 Home/Serving MSC

The serving MSC provides call termination to the wireless called party that is in the MSC's coverage area. The serving MSC communicates with the Visitor Location Register and Home Location Register (VLR & HLR) using the Mobile Application Part (MAP) to obtain and provide information about the wireless subscriber. When the wireless called party is in the home coverage area the serving MCS may be the home MSC.

### 2.1.9 HLR/VLR

The Home Location Register (HLR) and the Visitor Location Register (VLR) are existing components of a wireless network. These components are shown in the functional architecture diagram, in figure 1, to show that interaction with these components are required in some call scenarios. The Home Location Register (HLR) and the Visitor Location Register (VLR) may be separate components in the actual wireless network.

## 2.2 Description of the Reference Points

### 2.2.1 Reference point A

Reference point A is the Global PCS 500 Subscriber Database to Local/Remote SCP interface. It will be used for updating PCS numbers to SPID mappings.

### 2.2.2 Reference point B

Reference point B is the (Local) SCP to (Remote) SCP interface.

### 2.2.3 Reference point C

Reference point C is the Local/Remote SCP to HLR/VLR interface.

### 2.2.4 Reference point D

Reference point D is the originating SSP/MSC to Local SCP interface.

### 2.2.5 Reference point E

Reference point E is the Originating Switch/MSC to Local SCP interface. It may use TCAP query and response messages.

### 2.2.6 Reference point G

Reference point G is the Originating Switch/MSC with no TCAP to Originating SSP/MSC interface. It may use either SS7 signaling or MF signaling to route the PCS call to a switch.

### 2.2.7 Reference point H

Reference point H is the switch to switch interface. It may use SS7 signaling to establish the call connection(s).

### 2.2.8 Reference point I

Reference point I is the Home/Serving MSC to HLR/VLR interface.

## 3.0 Call Scenarios

The call scenarios described in this section are examples of the procedures involve in basic call delivery of PCS services using the proposed PCS access arrangement. Figures 2-3 illustrate the procedures for call delivery to a PCS wireline subscriber and figure 4 shows call delivery procedures to a PCS wireless subscriber.

In call scenario 1 depicted in figure 2, a call for a wireline PCS subscriber is originated from a switch/MSC with TCAP capability or an SSP/MSC with AIN/WIN functionality. The service provider of the PCS subscriber in the example is SPx. Thus, the subscriber's service profile is contained in the PCS SPx database[6]. The originating switch upon detecting a call initiation to a PCS subscriber will launch a query to the local SCP. The local SCP may contain both the PCS 500 numbers to SPID mappings obtained from the Global database[4] and the service profiles of the PCS 500 subscribers affiliated with SP1. For this specific call scenario, the local SCP will determine the SPID on the basis of the received PCS 500 number. The SPID information may be

[6] The call scenario assumes that the PCS subscriber's service provider is SPx such that the service profile of the PCS subscriber is contained in service provider x's PCS database. However, if the PCS subscriber is served by SP1 then the subscriber's service profile will be located in PCS SP1 database. When this is the case the local SCP will examine the PCS SP1 database content for the subscriber's service profile and the query to the PCS SPx database is not necessary.

a) an address indicating that the PCS subscriber's service profile is located in the Remote SCP's PCS SPx database. If that is the SPID then the local SCP might launch a query to the remote SCP for routing information[7]. When the Remote SCP receives the query request, it examines the PCS subscriber's service profile to obtain a GN for call routing and to determine the subscriber's billing preference. The Remote SCP returns a query response to the local SCP with routing and billing preference information. The local SCP then forwards the information to the originating switch in a query response message. This response is labeled as "a" in figure 2. The originating switch routes the call using the routing and billing preference information.

b) a CIC, a trunk group ID, or an address indicating a switch of the service provider. If that is the SPID then the local SCP sends a query response to the originating switch with the SPID. This response is labeled as "b" in figure 2. The originating switch routes the call using the SPID information.

Call scenario 2, illustrated in figure 3, contains the call delivery procedures for a call originated from a switch/MSC with no TCAP capability for a wireline PCS subscriber. When a switch/MSC with no TCAP capability receives a call initiation request for a PCS call, the switch/MSC routes the call to a switch (i.e., an access tandem) that has query capability to perform the number translation process. The subsequent procedures from this point are similar to the ones described in call scenario 1.

Call scenario 3 in figure 4 describes procedures for a call to a roaming wireless PCS subscriber that is originated from a switch/MSC with TCAP capability or an SSP/MSC with AIN/WIN functionality. The procedures for call scenario 3 are similar to call scenario 1 except when the Remote SCP examines the subscriber's service profile and realizes the GN is for a wireless terminal. In this example the Remote SCP may launch a LOCREQ to the HLR of the wireless terminal. The HLR may launch a ROUTREQ to the VLR (due to roaming) for a Temporary Location Directory Number (TLDN). When the HLR receives the TLDN, it forwards the TLDN to the Remote SCP. The Remote SCP returns a query response to the local SCP with the TLDN and billing preference information. The local SCP forwards the information to the originating switch. The originating switch uses the TLDN and billing preference information to route the call to the wireless PCS subscriber.

[7] The SCP to SCP interface might not be available or not used. Then, the local SCP returns the SPID information to the originating switch. A query to the Remote SCP is sent by the originating switch for routing information.

**Figure 1 - Functional Model of PCS 500 Access Arrangement**

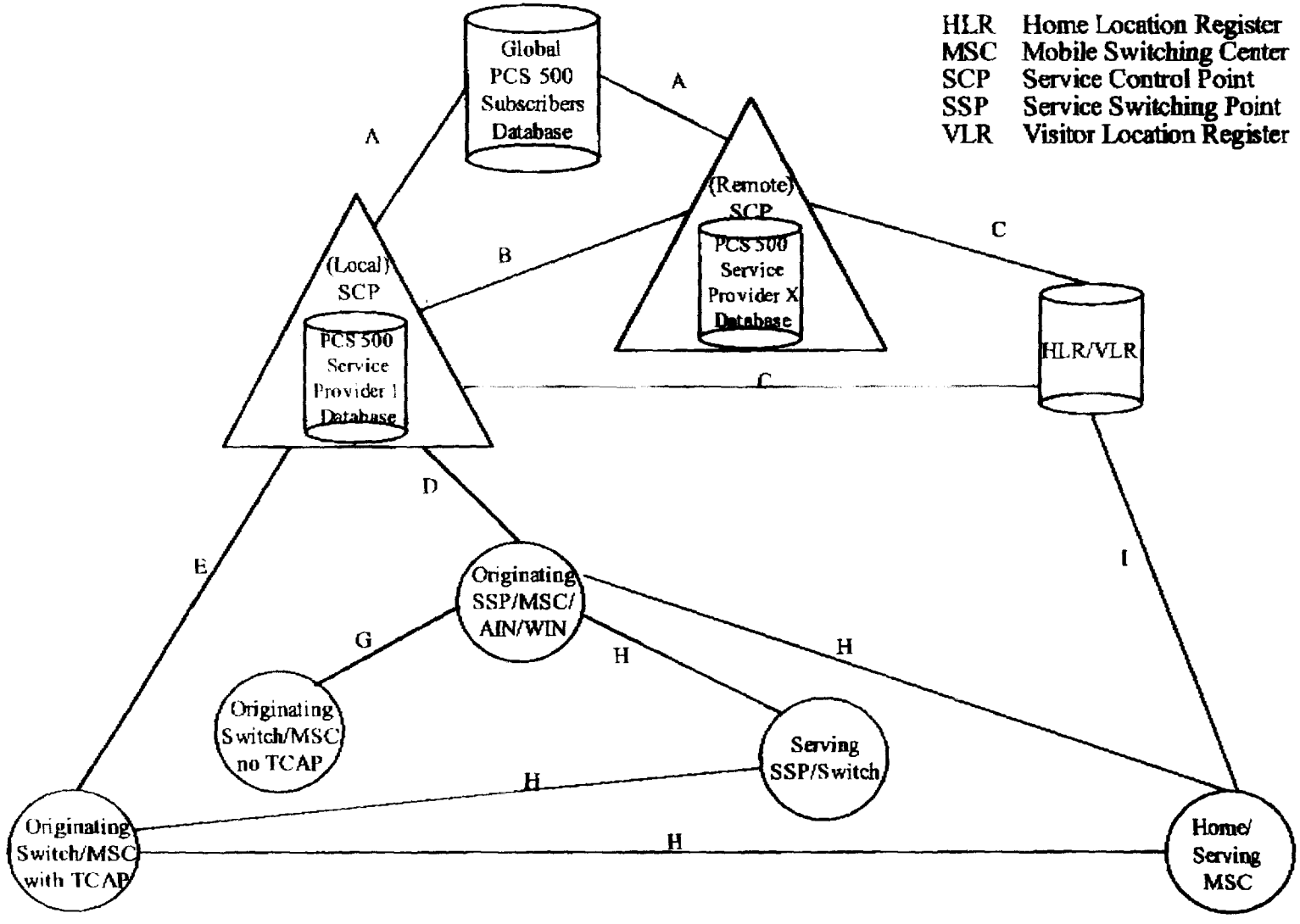
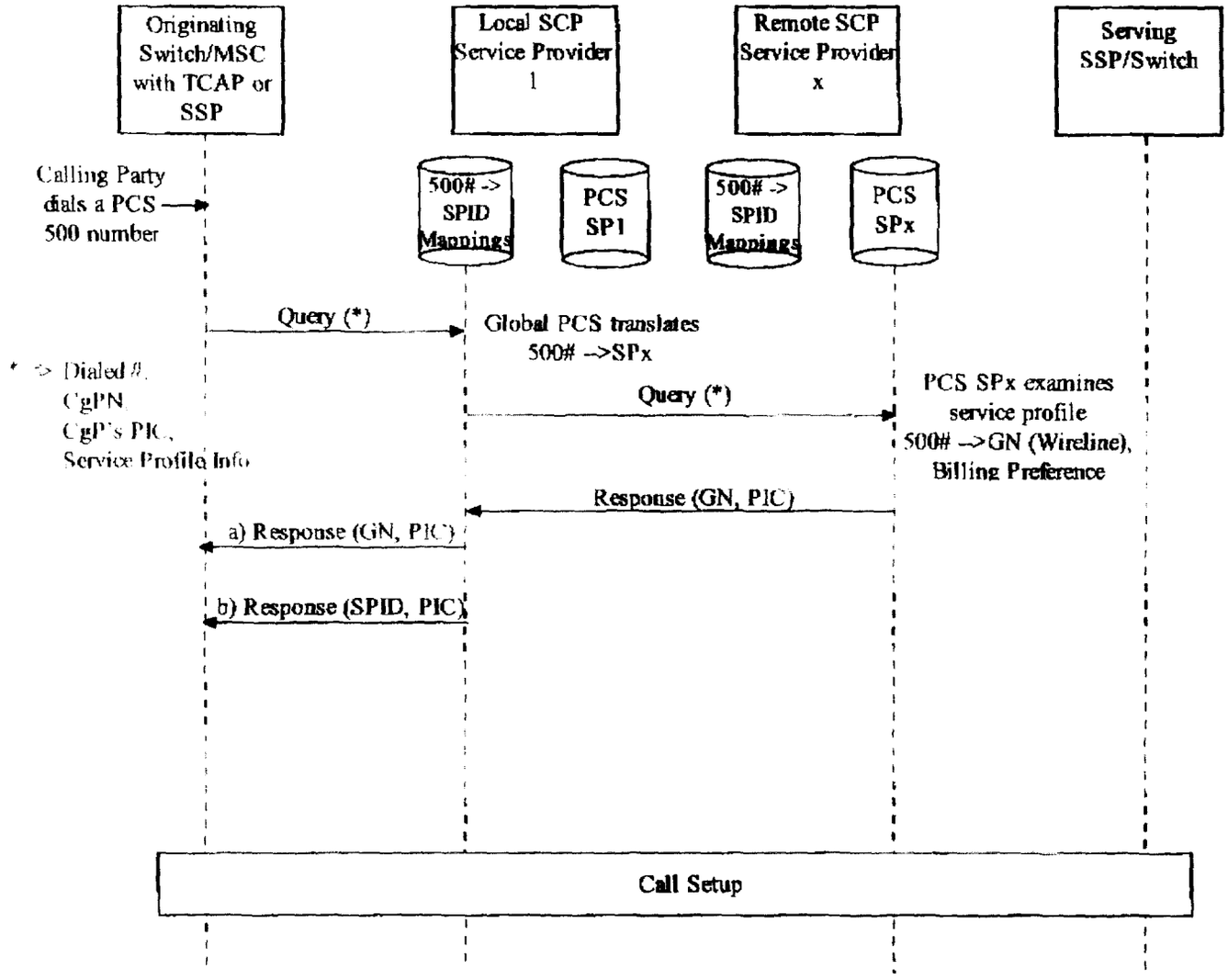
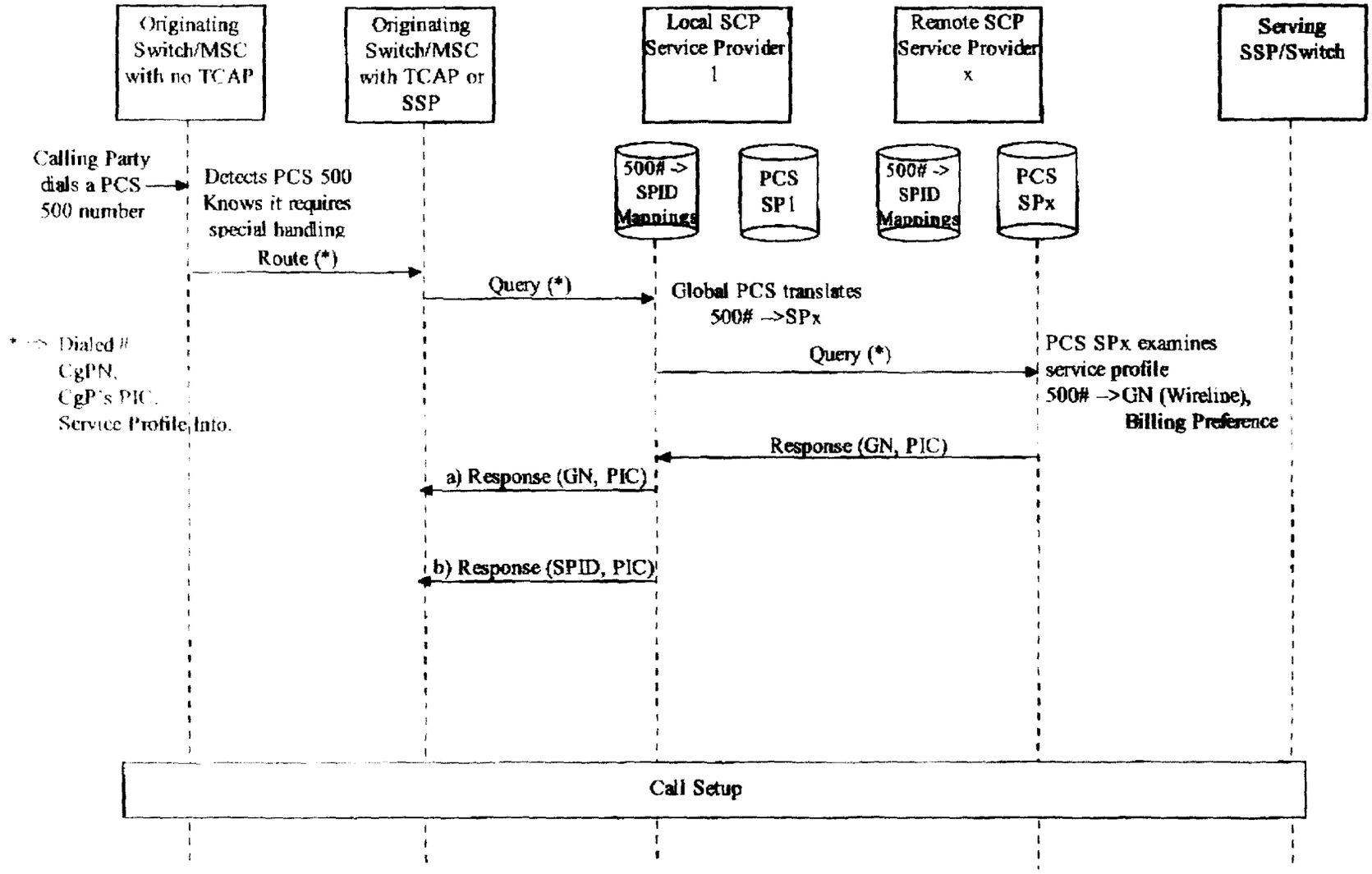


**Figure 2 - Call Scenario 1**



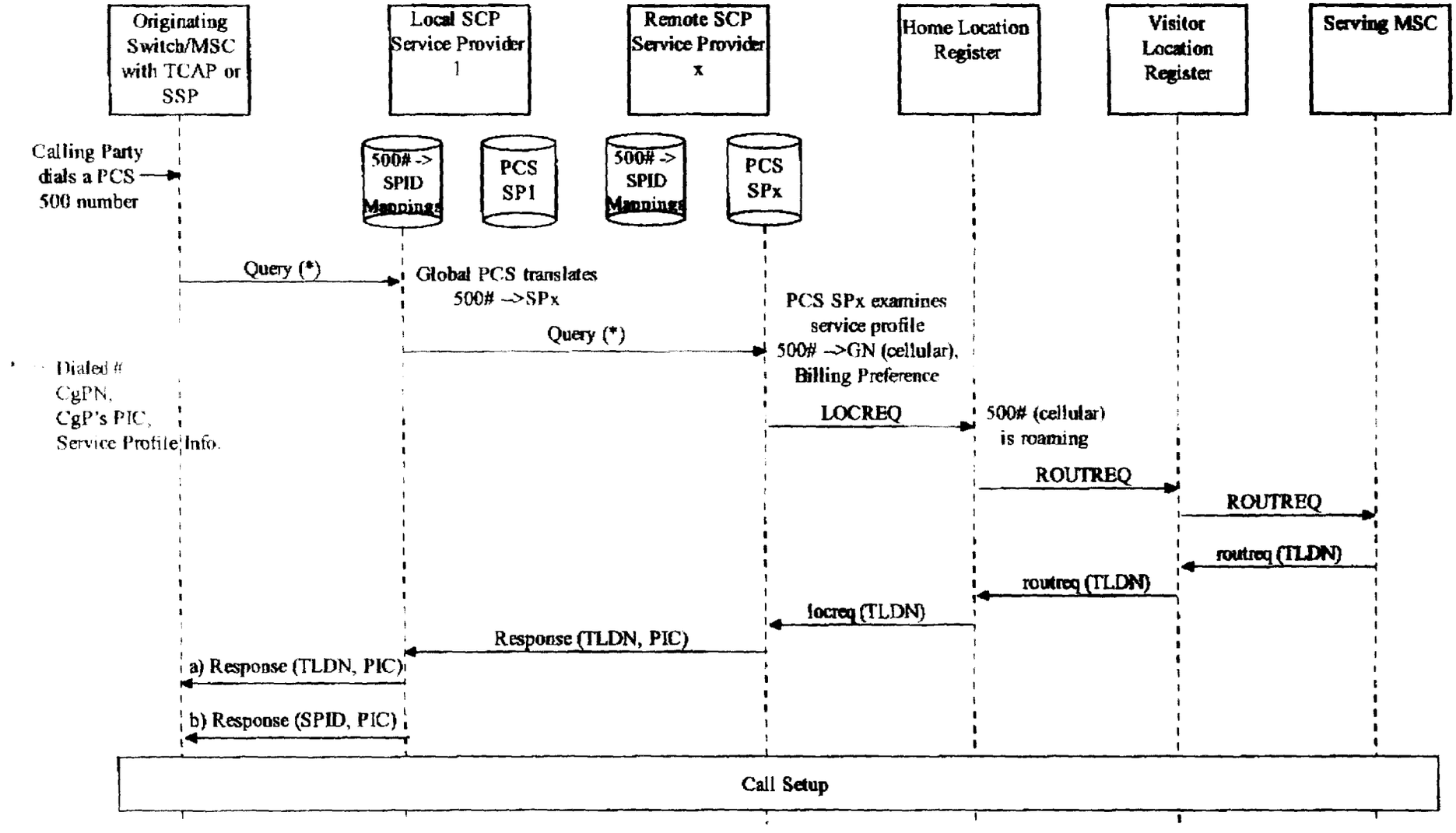

* Final content of the query/response messages TBD

**Figure 3 - Call Scenario 2**




* Final content of the query/response messages TBD

**Figure 4 - Call Scenario 3**




* Final content of the query/response messages TBD